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Integrated Disease Management (IDM) of White Rust of Rapeseed and Mustard

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SUMMARY

Rapeseed–mustard are major edible oilseed crops of the group Brassicas, cultivated in India and around the world. They are cultivated as annual or biennial crop worldwide. The major constraint in realization of higher yield of such oilseed Brassicas is its susceptibility to abiotic and biotic stress which cause substantial qualitative and quantitative yield loss. Besides abiotic factors, several diseases are known to occur in rapeseed–mustard with varying degree of severity. Of the important diseases that can create serious threat to successful cultivation of Rapeseed and Mustard, white rust is most devastating. As control measures, chemical control has been relied on overly and as such consequences of overutilization of chemicals has lead us to search alternatives. Use of biocontrol agents, botanicals incorporated with use of fungicides were found safer which is also known as integrated diseases management practice. Practice of IDM has a beneficial effect on yield enhancement of rapeseed–mustard with substantial reduction in white Rust of Rapeseed and Mustard as well as all the major diseases.

INTRODUCTION

Rapeseed and mustard belongs to the cruciferous crops. Many studies have shown that the crop is economically important in domestic and international trade as it yields edible oil ranging from 30-48 percent which is used as main cooking medium in Northern India. Of the several important diseases that can create serious threat to successful cultivation of Rapeseed and Mustard in past few years, white rust caused by *A. candida* is one of the most important disease and most devastating disease which affects the crop severely (Saharan and Verma (1992)). Such a high level of losses can be prevented by implementation of effective disease management practices and by understanding the pathogen population structure and mechanisms.With the growing awareness of harmful effects of pesticides, use of bio- agents *(Trichoderma viride, Pseudomonas flouresens),* plant extracts *(Allium cepa, Eucalyptus globulus and Azadirachta indica*) with less fungicidal spray is gaining importance in recent years (Mehta, *et al*., 2005). The concept of integrated disease management seeks to minimize the advantages in the use of chemical fungicide.

White rust of Rapeseed and Mustard

White rust belonging to family Albuginaceae are obligate parasites that cause white rust and staghead of Brassicaceae, Convolvulaceae, and others (Agrios, 1988; Farr et al., 1989). White rust is a disease in plants caused by the oomycete *Albugo candida.* The disease is characterized by local infection and systemic infection symptom expression. Symptom first appears as white or creamy yellow pustules or "blisters" on lower surface of leaves and Systemic infection results in unequal growth and distortion of inflorescence and flowers sterility, commonly known as "stag head" formed as a result of hypertrophy and hyperplasia. The epidemic development of white rust is dependent upon many factors, viz. aggressiveness of race, time of the disease appearance, amount of available initial inoculum and prevailing weather conditions. *A. candida* isolates from different Brassica species/cultivar or from different geographical regions may be different in their latent period, incubation period and

production of sporangia and zoospores, shape, pustule size and texture and aggressiveness. (Lakra and Saharan, 1988; Gupta and Saharan, 2002; Patni et al.,2009). Due to both phases (leaf and stag head) infection of white rust result in yield losses from 23 to 54.5 percent. Mostly the disease can be observed on lower surface of the leaves in the early January and later on it spreads rapidly to the upper surface of the leaves and also to the other aerial plant parts.

Integrated Disease Management

With the growing awareness of harmful effects of chemical pesticides, use of disease tolerant cultivar, crop rotation or sanitation practices, bio- agents, plant extracts to integrate with less fungicidal spray is gaining importance in recent years. The concept of integrated disease management seeks to minimize the advantages in the use of fungicides. IDM includes application of low dose of fungicides and to give more emphasize on crop sanitation, crop rotation, growing disease tolerant cultivars, use of plant extracts and bio-agents that appears to be the best leading strategy for management of disease without effecting human health. Many experiments has been carried out to validate the practicability of IDM.The efficacy of plant extracts (*Allium sativum* and *Acacia nilotica*) and different isolates of *Trichoderma viride* in controlling white rust of Mustard in a field experiment conducted in Rajasthan, India during the rabi seasons of 2000-03 inferred a promising outcome. Meena *et al*., (2011) reported seed treatment with *Trichoderma harzianum* and spraying with *Pseudomonas fluorescens* observe less severity of white rust infection along with general practices of crop production.

CONCLUSION

Rapeseed and mustard is ravaged by several diseases of which white rust plays a crucial part. Management of biotic stresses and such crucial factors demanded taking up heavy use of chemical control measures which backfired and is taking a toll on the health of humans as well as the environment. Increasing public concern about environmental health is the need of the hour. Integrated diseases management is a package of better practices which considers the health of human and environment. Production and better yield of agricultural products heavily relies on the use of chemical fungicides as chemical remains more effective in reducing disease in plants. The acceptance of biological control methods can offer positive outcomes in the agricultural sector in many parts of the world. The commercialization and production of biological control should be brought up on a commercial scale to be applied along with good crop sanitation, crop rotation, growing disease tolerant cultivars, use of plant extracts.

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